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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/774,192	01/29/2001	Maocheng Li	5430/ETCH/SILICON/JBI	7295

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Patent Counsel
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EXAMINER

CROWELL, ANNA M

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 05/14/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

TC-4

Office Action Summary

Application No.

09/774,192

Applicant(s)

LI ET AL.

Examiner

Michelle Crowell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 3,16-18, and 22-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-15,19-21 and 28-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-38 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

Species I – Figure 2

Species II – Figure 3

Species III – Figure 4

Species IV – Figure 5

Species V – Figure 6

Species VI – Figure 9

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 1 is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after

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the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. During a telephone conversation with Kevin Pontius on March 11, 2002 a provisional election was made with traverse to prosecute the invention of Species II, claims 1, 2, 4-15, 19-21, and 28-38. Affirmation of this election must be made by applicant in replying to this Office action. Claims 3, 16-18, and 22-27 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the voltage distribution electrode and the Faraday shield on page 8, paragraph 46 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 2, 4-21, and 29-33 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claims 1-6, 29, and 32

The appearance of the voltage distribution electrode, Faraday shield, and substrate is unclear. The specification does not describe the above elements as being circular with radial segments, however it does describe the heater as having the mentioned features.

Regarding Claims 6, 7, 13-15, 19-21

The term "substrate" is confusing. Is the substrate being processed or is it part of the chamber wall? What is the function of the substrate?

Regarding Claim 14

How can the "substrate" have plural radial elements and a circular element and be disposed at the periphery of the "substrate"?

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 2, 4-15, 19-21, and 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo et al. (U.S. 5,944,899) in view of Yoshida (U.S. 5,735,993), Okumura et al. (U.S. 6,177,646), and Rice et al. (U.S. 6,095,083).

Referring to Figure 1 and column 2, line 51 – column 3, line 33, Guo discloses an inductively coupled plasma reactor comprising a vacuum chamber 11 (semiconductor processing chamber), conductive wafer pedestal 22 (wafer support), gas distribution system 19 (gas delivery channel), and quartz dome 17 (dome-shaped lid, hemispherical-shaped lid), flange 18, sidewalls 14, base member 12 making up the chamber walls. A helical shaped RF induction coil 25 is disposed near the outside of the quartz dome. In addition, a fan 30, 31 is provided to exhaust the air in the annular space 26.

Guo fails to teach the heating element, voltage distribution electrode, Faraday shield, and substrate.

For purposes of examining, the voltage distribution electrode, Faraday shield, and substrate are the same element since they function similarly.

Referring to Figures 1, 2, and 7, column 3, line 51 – column 4, line 11, column 4, lines 29-57, and column 5, line 63- column 6, line 14, Yoshida teaches a plasma processing apparatus which uses a metallic resistor plate 3 (heating element, voltage distribution electrode, Faraday

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shield, substrate) to reduce capacitively coupling in the plasma and to heat the dielectric plate 2 (flat lid chamber wall). Moreover, both metallic resistor plate 1a (voltage distribution electrode, Faraday shield, substrate) and heater 1b (electrical, resistive heating element) are located in the dielectric plate 2 and have a circular shape with a plurality of radial slits 12. Metallic plate 1a acts in an electromagnetic-wave transmission function and heater 1b uniformly heats the dielectric plate 2. In addition, a temperature measuring element 6 (temperature sensor) measures the temperature of the dielectric plate 2 and a current controller 7 (power control circuit) controls the current supplied to the heater based on the feedback from the temperature measuring element 6. From Figure 7, the heater 1b is positioned between the flat spiral coil 1 (RF coil) and the dielectric plate 2 (chamber wall), and metallic plate 1a (voltage distribution electrode and Faraday shield) is situated between the heater 1b and the dielectric plate 2.

Referring to Figures 14-16, and column 16, lines 1-24, Okumura displays that the heat generating body 110 (heating element) is adjacent to the resistance conductor 111 (Faraday shield, substrate, voltage distribution electrode).

Referring to Figure 29, column 33, lines 43-48, Rice describes a radial slit 4060 (gap) placed in the heated silicon ring 62. The slit promotes greater thermal expansion of the silicon ring 62 without breakage.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the chamber wall of Guo with the heating element, voltage distribution electrode, Faraday shield, and substrate. This would reduce capacitively coupling in the plasma and heat the dielectric plate.

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Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC 
May 10, 2002


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700